UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA

July 31, 2017

Electronic transmittal via email
George (Patrick) Brooks, PG
Environmental Business Line Team Leader
Hunters Point, Treasure Island, Tustin, El Toro and San Diego NTC
Navy BRAC PMO West
33000 Nixie Way, Bldg 50
San Diego, CA 92147

Dear Mr. Brooks:

Thank you for providing the draft Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), Radiological Data Evaluation and Confirmation Survey, Hunters Point Naval Shipyard, San Francisco, California, dated June 26, 2017 (SAP). Enclosed please find US EPA's review comments.

The SAP was reviewed for consistency with the *Uniform Federal Policy Quality Assurance Project Plan Manual*, EPA-505-B-04-9, March 2005 (UFP-QAPP guidance) and EPA documents QA/R-5 *EPA Requirements for Quality Assurance Project Plans*, EPA/240/B-01/003 March 2001 [QA/R-5], and *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA/240/B-06/001 dated February 2006 (DQO guidance). In addition, the SAP's proposed data collection plan was reviewed in light of the history of data collection efforts, currently available data, extent of identified inconsistencies in reported results, and public allegations made regarding potential mis-representations of data and actual site conditions.

Please contact me at lee.lily@epa.gov or 415-947-4187 if you would like to discuss these comments further.

Sincerely,

Lily Lee
Remedial Project Manager

cc. Juanita Bacey, DTSC
Amy Brownell, SFDPH

USEPA Review of the Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Radiological Data Evaluation and Confirmation Survey, Hunter's Point Naval Shipyard, San Francisco, California, June 2017; Comments dated July 31, 2017

GENERAL COMMENTS

1. The Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Radiological Data Evaluation and Confirmation Survey, June 2017 (SAP) Executive Summary requires revision to provide clear and consistent information about which radionuclides will be reported for the Hunter's Point Naval Shipyard samples. In addition, the SAP should be augmented to provide a sufficiently robust data collection plan, as follows:

- The Executive Summary states that samples will be analyzed for a specified list of primary radionuclides, which include Cesium-137 (Cs-137), Radium-226 (Ra-226), Bismuth-214 (Bi-214), Lead-214 (Pb-214), Potassium-40 (K-40), Actinium-228 (Ac-228), Bismuth-212 (Bi-212), and Lead-212 (Pb-212). All of these radionuclides are reported from gamma spectroscopy analysis. However, additional daughter or parent radionuclides of decay chains associated with some of these primary radionuclides that are commonly reported from gamma spectroscopy analysis are not listed. It is noted that most of the common naturally occurring radionuclides in soil that are reliably quantified using gamma spectroscopy are included in SAP Worksheet #15a, Reference Limits and Evaluation – Soil Gamma Spectroscopy, but the SAP does not specify if all of the radionuclides included in SAP Worksheet 15a will be reported for all samples. The SAP should be revised to clarify the list of radionuclides.

- Some additional naturally occurring decay chain radionuclides should be quantified by gamma spectroscopy analysis to verify which areas are in secular equilibrium. Determining which areas are in secular equilibrium will provide more information regarding natural background variations. As such, the following radionuclides should be reported from the gamma spectrometry analyses.

    - All Thorium Series radionuclides should be reported, including Ac-228, Thorium 228 (Th-228), Ra-224, Pb-212, Bi-212, and Thallium 208 (Tl-208)

    - All Uranium (U-238) Series radionuclides should be reported, including Protactinium 234m (Pa-234m), Pa-234, Ra-226, Pb-214, Bi-214

- All U-235 Series radionuclides should be reported, including Pa-231, Th-227, Ra-223

- Europium 152 (Eu-152) and Eu-154 should be reported

- K-40 should be reported

- The SAP includes Th-232 and Th-234 in the list of radionuclides reported by gamma spectrometry. However, Th-232 produces a low energy gamma ray and is more reliably and efficiently reported by alpha spectrometry. Therefore, thorium isotopes should be reported in all alpha spectrometry analyses.

- The does not include a requirement to report Americium-241 (Am-241) by alpha spectrometry. Since Am-241 produces a low-energy gamma ray, the more efficient and reliable method for quantifying Am-241 is by alpha spectrometry. Am-241 should be reported in all alpha spectrometry analyses.

- The SAP does not propose to conduct alpha spectrometry analyses on all future samples collected to support site cleanup and property transfer. Given the extent of allegations and potential data quality issues, EPA requests that all future samples collected to support site cleanup and property transfer at the site be analyzed by alpha spectrometry for Am-241, as well as for all plutonium, uranium, and thorium isotopes.

- The Executive Summary states that Am-241, Cobalt-60 (Co-60), Eu-152, and Eu-154 will be analyzed on an as-needed basis. However, these radionuclides are easily reported from gamma spectroscopy analysis, which would provide additional useful information at low incremental effort/cost. It is therefore requested that these radionuclides be reported in all future samples collected at the site.

The comments above relate to the SAP created for the purpose of addressing the uncertainties due to prior falsification of radiological data by Tetra Tech EC, Inc. However, for the longer term, beyond the scope of this specific SAP, EPA also encourages consideration of the following recommendation: Based on the current situation of additional allegations of inappropriate data collection/site investigation actions coming forward, EPA recommends that the full list of radionuclides and analyses included in Worksheet #15a – #15f, as well as the additional radionuclides listed in the bullet points above, be analyzed for <u>all future samples</u> collected in support of cleanup and property transfer at the Former Hunter's Point Naval Shipyard site.

2. The SAP does not include all of the information necessary to determine how radionuclides reported by gamma spectrometry will be quantified and reported. As such, the SAP should include a copy of the laboratory's gamma spectrometry library, sorted by radionuclide, and include all energies and abundance percentages used for calculating activity. In addition, the SAP does not specify if sample-specific Minimum Detectable Concentrations (MDCs) will be reported for all radionuclides in all samples. Please revise the SAP to include the information specified above and the laboratory's standard operating procedures (SOPs) that include this information.

3. Many of the radionuclide MDCs listed in Worksheets #15a - #15f are at or only slightly below the project screening limit; however, in order to ensure sample results are sufficiently repeatable and reliable, MDCs should be at least 10 percent (%) lower than the release criteria for the each of the Radionuclides of Concern (ROCs), if possible. For example, requesting a lower detecting limit helps to ensure that the result plus the uncertainty does not exceed the release criteria. Please revise the SAP to address this concern.

4. Several SAP worksheets do not include a position for a Quality Assurance Manager for the implementing organization, CH2M Hill. In accordance with EPA document QA/R-5 – EPA Requirements for Quality Assurance Project Plans (EPA/240/B-01/003) March 2001 [EPA QA R/5], the organizational structure for the implementation of a quality program should include both technical and management elements to ensure adequate implementation of quality requirements. The following worksheets should be revised to include the appropriate quality assurance staff/management in accordance with EPA QA R/5:

- Worksheet #3, Distribution List should include the name(s) of quality assurance (QA) personnel that will receive a copy of the SAP.
- Worksheet #4, Project Personnel Sign-Off Sheet should include a requirement for the implementing organization to have QA management sign off on the SAP.
- Worksheet #5, Organizational Chart includes placeholders for QA management, but does not include the actual personnel names for these positions. The organizational chart should include the names of the project QA management staff.
- Worksheet #6, Communication Pathways should include the QA function in all applicable communication pathways (e.g., development and changes to the SAP, field quality issues and stop work orders, data quality assessment and reporting, etc.).
- Worksheet #7, Personnel Qualifications should include the Quality Management staff since this QA oversight function is critical to the success of the project.
- Worksheet #14 discusses senior quality assurance/quality control (QA/QC) manager oversight, but it is unclear who will perform this oversight. This should be discussed in Worksheet #7 where it is indicated that the Radiological Lead will also provide oversight.

- Worksheet #32, Assessment Findings and Corrective Action Responses should list a QA Manager that is responsible for overseeing the assessment findings responses and corrective actions.

Please revise the SAP to include CH2M Hill QA staff/management in the appropriate SAP worksheets.

5. Several SOPs are missing from the SAP. Worksheet #14 states that it contains detailed procedures for field activities; however, the procedures listed in Worksheet #14 are insufficient. Missing SOPs include those for test pitting, backhoe use, backfilling and compaction, etc. Please revise the SAP to include SOPs for all activities to be conducted at the site.

6. SAP Worksheet 7, Personnel Responsibilities, indicates the listing of education and training requirements for project-critical staff is optional and neither Worksheet 7 nor Worksheet 8, Special Training Requirements and Special Certifications include any reference to the special training required to conduct sampling and analysis of potentially radiologically contaminated material. Please revise SAP Worksheets 7 and 8 to include qualification requirements for the appropriate project personnel, or to reference the document and section number where this information is provided.

7. The SAP Worksheet #13, Secondary Data Criteria and Limitations Table indicates that archived samples will be used in conjunction with new data to determine the adequacy, consistency, and validity of the prior TetraTech survey data; however, the SAP does not indicate how it will be determined that archived samples are representative of the areas sampled. For example, the possibility exists that samples that were archived may have been substituted or altered. Please revise the SAP to state how it will be determined that the archived samples are representative of the areas from which they are alleged to have been collected.

8. SAP Worksheet #14, Summary of Project Tasks (page 52), discusses the removal of soil for Test-Pitting and Direct-Push Drilling in order to collect samples, but should be revised to clarify how back fill will be selected and placed. For example, the text states, "[W]hen a test pit is complete, it will be back filled with the original material;" however, this statement does not clarify whether backfill will be screened for radioactivity or if the results of soil sample analysis will be completed prior to backfilling a trench or boring. In addition, backfill may be handled differently in areas considered non-impacted verses areas considered potentially impacted, as follows:

- The backfill discussion does not distinguish between how backfill will be handled in background areas (non-impacted) versus areas with potential contamination

(impacted). If test pits are completed in areas considered non-impacted, then refilling the hole with the original material may be acceptable; however for areas that are considered impacted or that were affected by site operations, at a minimum, a scan of the material should be performed before placing it back into the hole. If scanning is not an option, the test pits should be filled with clean fill, and not the original material.

- For non-impacted locations, the text should discuss how the original material that will be used as backfill will be distinguished from natural soil and/or the fill soil used to construct Hunters Point.

Please revise Worksheet #14 to address these concerns regarding backfill.

9. SAP Worksheet #14, Summary of Project Tasks, does not list gamma or gross alpha/beta scanning as one of the field activities. Since there is some uncertainty about the extent to which previous field sampling and remediation activities were implemented in accordance with approved work plans, a gamma walkover survey and/or a gross alpha/beta survey may be needed prior to sampling. Please revise the SAP to include information pertaining to any potential gamma or gross alpha/beta scanning that will be conducted as part of the field activities, or to reference the appropriate sections of the HPNS Radiological Work Plan that includes this information.

10. Worksheet #14 discusses statistical testing (e.g., Steps 3 and 7), but the SAP does not indicate that the results of this testing will be presented in any applicable reports. If statistics will be used, please revise the SAP to indicate that the any applicable planning documents and/or reports will discuss why the statistical tests were deemed appropriate (e.g., the assumptions behind the statistical test, and whether the data met those assumptions) and provide sufficient information to verify any statistical calculations.

11. The SAP (e.g., Worksheets #15c and #30) lists the method for Total Strontium/ Strontium-90 (Sr-90) as 905.0; however, this is a method for analyzing drinking water, not soils. Please revise the SAP to list the applicable method for analysis of soil samples, or alternatively, indicate that 905.0 has been modified to include a soil matrix. If 905.0 has been modified, please also revise the SAP to list the modifications and reference or provide equivalency studies that demonstrate that the changes to the method do not adversely affect method reliability.

12. The Executive Summary states that some samples may be analyzed for additional radionuclides and may include Am-241, Co-60, Eu-152, Eu-154, Plutonium-238 (Pu-238), and Pu-239; however, Table #15b does not include a Project Screening Limit for Pu-238. Please revise Worksheet #15b to state how any potential detections of Pu-238 will be evaluated.

13. SAP Worksheet #21, Project Sampling SOP References, does not include any information pertaining to field gamma or gross alpha/beta scans, even though Worksheet #22, Field Equipment Calibration, Maintenance, Testing and Inspection, references calibration procedures for gamma and gross alpha/beta scanning survey meters and data loggers. In addition, Worksheet #21 references Attachment 4 for the inclusion of the SOPs; however, Attachment 4 also does not include any SOPs for these types of scan measurements. Please revise Worksheet #21 to list all field testing/survey SOPs. Also, please ensure that all SOPs referenced in Worksheet #21 are included in Attachment 4.

14. SAP Worksheet #26, Sample Handling, does not include a detailed description for post-sampling handling of samples. In addition, while Worksheet #27 does list some information pertaining to laboratory personnel handling of samples, the description is incomplete because it does not discuss how samples will be tracked throughout the analysis process, and does not describe how long soil samples will be retained at the laboratory. Please revise Worksheets #26 and #27 to include more detailed descriptions of the sample handling procedures at the laboratory and/or to reference the appropriate SOP or laboratory Quality Management Plan (QMP) that includes these instructions. Also, please ensure a copy of the relevant SOP(s) and laboratory QMP are included in the appendices/attachments to the SAP.

15. SAP Worksheets #34 (Verification (step I), #35 (Validation (Steps IIa and IIb), and #36 (Validation (Steps IIa and IIb) Summary do not provide sufficient information about which data validation guidelines will be used, which organizations are responsible for verification and validation, what frequency data will undergo verification and validation, how and where data validation reports will be transmitted to and approved, what will be included in the data validation report(s), and what timeframe will be required for transmittal of such reports. In addition, these worksheets do not reference any pertinent SOPs for conducting verification and validation. Please revise these worksheets to include this level of detail.

16. The SAP states that the GEL Laboratories' Environmental Laboratory Accreditation Program (ELAP) certification expired on June 30, 2017. Please revise the SAP to include the current accreditation certificates for all the proposed laboratories.

17. There are no details about the QA/QC manager assessment. Worksheet #14 states, "A Senior QA/QC manager with knowledge of radiological QA/QC will be present in the field for the duration of soil confirmation sampling activities. The QA/QC manager's sole responsibility will be to ensure that the quality control measures in the project plans are performed. The QA/QC manager shall maintain all QA/QC records for review and provide copies in the final report." However, this assessment is not discussed in

Worksheet #31 or #32. Please revise Worksheets #31 and #32 to discuss the QA/QC manager assessment.

18. While the data quality assessment (DQA) is discussed in Worksheets #33 and #37, it is unclear what information will be included in the DQA/Data Usability Assessment reports. The DQA/Data Usability Assessment reports should include a detailed description explaining how the data were evaluated (e.g., for trends and biases, how it was determined data quality objectives were met), and overall defensibility/usability so that sufficient analysis is conducted to support the data usability conclusions. In addition, the data usability assessment should provide analyses specific to evaluation of radionuclides in the environment, such as evaluating equilibrium of parent/daughter radionuclides and the consistency of naturally occurring radionuclides (i.e. potassium-40) for a given location/area. Please revise the SAP to indicate that a detailed discussion of the data usability evaluations will be included in the DQA/Data Usability Assessment reports, along with sufficient information to support the data usability conclusions. Please also revise the SAP to indicate that the information discussed in Worksheet #37 will be included in the DQA/Data Usability Report.

19. The SAP requires revision to specify whether statistical tests will be run after Survey Units are resampled to determine if more sampling should be performed based on the new results. In addition, the SAP requires revision to specify if the new sample results be imported into the FRED and NRI databases. Please revise the SAP to address these items.

20. The SAP does not specify that Task Specific Plans (TSPs) for each survey unit will be submitted for regulatory review prior to implementation of any field data collection activities. Please revise the SAP to include a requirement for Task Specific Plans to be submitted to the regulatory agencies for review and approval prior to commencement of sampling.

SPECIFIC COMMENTS

1. **SAP Worksheet #6, Communication Pathways, Pages 25-28:** Please revise the worksheet to specify that the regulatory agencies will be notified of significant corrective actions and field deviations from the SAP, and when SAP amendments are issued. Please also revise the worksheet to specify that Regulatory Agencies will receive SAP amendments with sufficient time for review before applicable changes are implemented in the field. Additionally, please revise Worksheet #6 to include the form of communication for these items.

2. **Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements, Step 4, Define the Boundaries of the Study, Page 43:** Step 4 only vaguely defines the boundaries of the study. For example, the range of the vertical boundaries and how surface and subsurface soil are defined are unclear. While it is understood that additional

details will be presented in each site's respective Task-Specific Sampling Plan (TSP), the range of expected vertical boundaries should be included. Please revise Worksheet #11 to specify the expected range of vertical boundaries and to define surface and subsurface soil.

3. **Worksheet #14, Summary of Project Tasks, Soil Sample Collection, Page 53:** The text identifies the use of steel mixing bowls for homogenizing soils collected at depths below the surface, but it does not address how cross contamination will be prevented. This section of text should discuss how the bowls will be decontaminated between sample locations or should state that new clean bowls will be used for each sample location. Please revise the text to clarify whether bowls will be decontaminated or if new clean bowls will be used for each sample.

4. **Worksheet #14, Summary of Project Tasks, Soil Sample Collection, Page 53:** The text indicates that soil samples will be placed in a cooler with ice; however, it is unnecessary to preserve samples for radiological analysis with ice. Moreover, Worksheet #19, Field Sampling Requirements (Page 71), indicates that preservation is not applicable. Please revise the text to state that preservation of soil for radiological analysis is unnecessary and to remove all references to placing samples on ice.

5. **Worksheet #14, Management of Investigation Derived Waste (IDW), Page 54:** The proposed sampling procedures to identify low-level radioactive waste (LLRW) and low-level mixed waste (LLMW) are inadequate. Given the allegations that soil with elevated radioactivity was placed back into the trenches and that samples may not have been collected from areas with elevated radioactivity, it cannot be assumed that IDW soil in a 55-gallon drum is uncontaminated. As required during all radioactive investigations and remediation at Hunters Point, soil should be spread out on a radiological screening pad, scanned, and sampled as required by the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) to evaluate whether it is LLRW, LLMW, etc. Please revise the text to state that IDW soil will be spread out on a screening pad and scanned and that sampling procedures to identify radioactive contamination of soil will follow MARSSIM.

6. **Worksheet #17, Sampling Design and Rationale, Page 67:** While sampling design and rationale outlined in each site's respective TSP, it is unclear from the text whether the TSPs will contain sufficient description as outlined in EPA guidance for Optimized Uniform Federal Policy-Quality Assurance Project Plan Worksheets, dated March 2012 (QAPP Guidance). For example, it is unclear if decision processes for changing sample locations have been developed or how contingencies during field conditions could affect the sample design. Please revise the text to ensure that sample design and rationale in the site TSPs will contain details as outlined in the QAPP Guidance.

7. **SAP Worksheet #12, Measurement Performance Criteria, Page 45:** This worksheet indicates that split samples will be collected, and that there are no applicable

measurement performance criteria. As such, it is unclear how split samples will be evaluated. Please revise the SAP to discuss the evaluation of split sample results.

8. **SAP Worksheet #22, Field Equipment Calibration, Maintenance, Testing and Inspection, Page 77:** This worksheet indicates that the manufacturers' specifications will be used for calibration, maintenance, testing, and inspection activities of the equipment listed. However, these specifications have not been included in the SAP. Please revise this worksheet to include the aforementioned specifications, or reference where this information may be found (e.g., as a SAP appendix). Alternatively, please revise the SAP to indicate that instrument calibration information will be submitted as an appendix to all applicable reports.

9. **SAP Worksheet #23, Analytical SOP References, Page 79:** The list of SOPs in this worksheet is not consistent with SAP Attachment 5. SAP Attachment 5 provides SOP GL-RAG-I-006, which is not listed in Worksheet #23. Please revise Worksheet #23 to include all applicable laboratory SOPs.

10. **SAP Worksheet #29, Project Documents and Records, Page 93:** The information presented in this worksheet is insufficiently detailed. For example, Worksheet #29 does not include a description or reference to a SOP that states how data will be acquired and stored (i.e., software or laboratory information system, what safeguards are in place to maintain the integrity of the data, what type and frequency of quality checks of the data will occur to ensure the accuracy of the electronically stored data, what will be included in the laboratory data packages, how the data will be transferred and reported from the laboratory to the implementing organization and the Navy, and how the data will be archived (i.e., electronic or hard copy, and location and security of archival facilities). Please revise the SAP to provide greater detail regarding the data management, reduction and reporting tasks as per Section 3.5, Data Management Tasks, of the *Uniform Federal Policy Quality Assurance Project Plan Manual*, dated March 2005 (UFP QAPP Manual).

11. **SAP Worksheet #31, Planned Project Assessment, Page 97:** This worksheet specifies that CH2M Hill will conduct data reviews, however a description of what will be included in a data review and the frequency of such reviews should be specified. Please revise Worksheet #31 to include this additional information.

12. **SAP Worksheet #33 QA Management Reports, Page 101:** Worksheet #33 indicates the DQA report will be conducted once. However, it is unclear if this is intended to indicate that a DQA report will only be provided once across all parcels, or once per parcel. Additionally, it is unclear if the DQA will be conducted for all data. Please revise Worksheet #33 to clarify whether all data will undergo a DQA, and to clarify the intended frequency of generation of the DQA report.